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UNITED STATES PATENT APPLICATION

of

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TITLE: ANTIMATTER ELECTRICAL GENERATOR

ABSTRACT

The present set of complementary inventions refers to a system for the practical and inexpensive procurement of huge amounts of energy derived from the principles of matter-antimatter generation and annihilation. The generator will comprise the functions of generation, amplification, concentration and collision of photons within a specially designed self-reflective chamber; the generation of particles of matter and antimatter derived from the collision of photons; the ionization of atoms and the production of avalanches of electrons and positrons within a specialized collecting chamber; the separation of electrons and positrons by the action of powerful rotational electromagnetic fields; and, the conversion of said avalanches of electrons and positrons into electrical power. A second embodiment will separate particles of matter and antimatter generated in a similar way into antimatter fuel by the action of rotational monopolar electromagnetic fields.

RELATED PATENT APPLICATION:

[0001] This application claims priority to U.S. Provisional Patent Application No. 60/626,546 entitled "Antimatter Electrical Generator", identifying Alberto Molina-Martinez as the inventor. The subject matter of U.S. Provisional Patent Application No. 60/626,546 is hereby incorporated by reference in this application.

FEDERALLY SPONSORED RESEARCH Not Applicable

SEQUENCE LISTING OR PROGRAM Not Applicable

BACKGROUND OF THE INVENTION - FIELD OF THE INVENTION

[0002] The present invention relates to the field of electricity generation and more particularly to electric power extracted from the collision and annihilation of matter and antimatter particles.

BACKGROUND OF THE INVENTION

[0003] Contrary to the massive amounts of energy and extremely costly installations needed today for the acceleration and collision of subatomic particles at near the speed of light, which has kept antimatter as an utopian source of energy, the present invention encompasses in itself the generation, amplification, concentration and collision of photons for the production of matter and antimatter particles and the direct conversion of their energy into electric power and/or antimatter fuel, in a practical and inexpensive way.

Particle physics

[0004] As Physicists penetrate more and more deeply into the constitution of matter, the more we have learned about the subatomic particles, forces and forms of energy of which matter and the universe are made of. Some of these particles are considered elemental particles since they have not constituents but themselves, as electrons, up quarks and down quarks. The rest of parts of the atom are made of a combination of these three elemental particles. Some others have been found or produced artificially but are unstable and are not found in nature. In the same way some forces that keep particles, atoms and molecules together have been identified and named as: Electromagnetism (which keeps particles of different charge together, and apart the ones of similar charge); Residual Electromagnetic Force (which keep atoms together); Strong Force (which keep quarks together); Residual Strong Interaction (which keeps the nucleus together); Weak Force (which holds together unstable massive quarks and leptons), etc. The Photon has been found to be the carrier particle of Electromagnetic Force, while the Gluon is the carrier particle of Strong Force, and the carrier particles of Weak interactions are called W^+ , W^- and Z , being the W s electrically charged, and Z , neutral.

Decay, Antimatter & Annihilation.

[0005] Some unstable elements may decay into other elements, liberating energetic particles in a phenomenon known as radiation. Scientists have identified three types of radiation which are called Alpha (composed of Helium nuclei), Beta (which are high speed electrons) and Gamma radiation (which is made of high energy photons). Elemental particles may decay but into a less massive particle and a force-carrier particle.

[0006] Also it has been found that every particle that exists has its own anti-particle or anti-matter, which is exactly equal but opposite. Scientists ignore where the antimatter went, since it has not been found in the universe. When a matter particle encounters its antimatter particle they both completely annihilate into a very energetic force carrier particle (Gluon, W/Z or Photon). These force carriers then transform into other particles. The antimatter phenomena has long been considered as the ultimate source of energy, but a practical or efficient way to seize it has not been yet discovered, until now.

Particle Accelerators

[0007] Physicists use enormous particle accelerators to produce high energy particles collisions in order to study the composition of matter. There are two types of accelerators, linear accelerators which are called Linac, and circular or semicircular accelerators named Synchrotron. Synchrotrons must have a perimeter of many kilometers in order to accelerate particles near the speed of light before the collisions. The Large Hadron Collider, under construction in Europe in an international collaboration, will have a perimeter of twenty seven kilometers. Modern accelerators consist basically of: a Particle Generator; a Linac, which provides the initial linear acceleration to the particles; the Synchrotron for the grand acceleration, and the Detectors, where the collisions take place and which trace the events and register data for subsequent study and analysis.

[0008] The Synchrotron, the main accelerator, consists of a vacuum chamber, which is a metal pipe where air is permanently pumped out, that goes all along the accelerator and where the particles are accelerated to near the speed of light; vacuum pumps; dipole and quadrupole magnets, which will give the particles direction and focus, respectively; radio-frequency cavities, which will accelerate the particles by transferring energy to them from powerful radio-waves amplifiers; high voltage instruments and electronic circuits, etc.

[0009] Detectors typically consist of several layers of different detecting areas surrounding the vacuum chamber: first comes the Tracking Chamber, which will show the path of some particles as electrons, positrons, muons, protons, etc, but not others as photons or neutrons, indicating their charge and momentum; second, the Electromagnetic Calorimeter, which will detect and measure the energy of light particles as electrons and photons as they interact with the electrically charged particles inside matter; third, the Hadronic Calorimeter which measure the energy of hadrons, particles containing quarks, like protons and neutrons, as they interact with the atomic nuclei; fourth, the Muon Detector, which can be gas-filled chambers that will detect the passage of Muon charged particles that normally travel long distances and pass all the way through the detector leaving only a signal on this detector.

[0010] Calorimeters may consist of layers of high density absorbing material as lead or steel, which will slow down charged particles, interleaved with layers of an active medium such as solid lead-glass or liquid argon.

[0011] Special type of detectors are the Multiwire Proportional Chambers, which consist essentially of a set of thin, parallel and equally spaced anode wires, walled in between two cathode planes, in a gaseous atmosphere. When a negative potential of some level is applied to the cathodes, the anodes being grounded, an electric field develops as to attract electrons liberated by ionizing events as the crossing of charged particles. An avalanche multiplication of free electrons will then occur, amplifying the signal, which can then be measured.

[0012] Multiwire Proportional Chambers, for which the 1992 Nobel Price in Physics was awarded to Georges Charpak of CERN (European Organization for Nuclear Research) had permitted among many other discoveries, the elucidation of the behavior and the effect of charged particles crossing masses of atoms at rest, which causes the ionization of said atoms and the generation of electron-ion pairs, this is an electron and a positron, matter and antimatter of each other. The electron pair will continue to drift, creating more electron pairs and so on, forming, under the proper circumstances, what is known as an avalanche multiplication in proportional counters.

Efficiency

[0013] The particles used for the collisions are relatively easy and cheap to produce. Electrons are produced by heating metals; Protons can be easily obtained by ionizing hydrogen; Antiparticles can be obtained by making energetic particles hit a metal target, in a process where first, carrier particles as Photons or Gluons are created and then transformed into pairs of particles and antiparticles, which in turn are separated by the use of magnetic fields. Photons are easy and cheap to produce by the trillions just by the stimulation of atoms of many materials with electric discharges or light flashes.

[0014] However, the amount of energy needed to store and then accelerate particles for the collisions is, by very far, greater than the energy obtained from the collision of the particles, making the process extremely inefficient in energy terms. In the same way, the cost of building a Synchrotron is in the order of billions of dollars. Obviously, those installations are designed for research purposes, not for energy production.

Particles Collisions

[0015] When an electron and a positron (the anti-electron) collide at high energy, they annihilate releasing a tremendous amount of energy (accordingly to $E=mc^2$) in the form of a Photon or a Z particle, which then converts into a D⁺ meson (a particle made of a charm quark and an anti-down quark) and a D⁻ meson (a particle made of an anti-charm quark and a down quark).

[0016] In the same way, a quark from within a proton and an anti-quark from an anti-proton colliding at high energy will release a great amount of energy (accordingly to $E=mc^2$) in the form of a Gluon, from which a top-quark and a top-antiquark emerge, which then decay into other particles.

[0017] Similarly, when two Photons collide they form a charm quark and an anti-charm quark, which in turn convert into a C-Jet (a beam) of particles and a C⁻-Jet of antiparticles of the first, releasing a formidable amount of energy, in the order of 183 to 209 GeV per collision, as consistently has been observed and recorded by scientists with the ALEPH detector at the Large Electron-Positron Collider at CERN.

Light and Photons

[0018] Photons, or electromagnetic particles, are considered packages of pure energy traveling at the speed of light, 299,792,458 meters per second in vacuum, which behave also as electromagnetic

waves. The wavelength and the wave frequency is what determine the type of electromagnetic wave. Radio waves, Microwaves, Visible Light, X-Rays and Gamma Rays are all electromagnetic waves or photons. Visible light from violet to red light is just one thousand of the electromagnetic spectrum. The amount of energy of an electromagnetic wave depends on its wavelength and the frequency. Thus, gamma rays have the most energy, and radio waves have the least.

[0019] The energy of a single photon is given, in terms of its frequency, f , or wavelength, λ , as,

$$W_{ph} = hf = hc/\lambda$$

where h is Planck's constant,

$$h = 6.626 \times 10^{-34} \text{ Joules} = 4.135 \times 10^{-15} \text{ eV} \cdot \text{sec}$$

and c , the speed of light in free space,

$$299,792,458 \text{ m/s}$$

[0020] According to these formulas visible photons range in energy from 1.77 eV (at 700 nanometers wavelength) to 3.1 eV (at 400 nanometers wavelength). The photons with the most energy known, the Gamma Ray photons, range in energy from 0.0413 MeV to 0.41 MeV (Mega-electron-volts), with wavelengths between 0.03nm and 0.003nm, respectively.

[0021] How come then, a collision of two photons can yield an amount of energy in the order of 183 to 209 GeV (Giga-electron Volts) as measured with the ALEPH detector at CERN? These amounts of energy are easily millions of times the sum of two photon's energy, as calculated before. Even for the most energetic photons, these amounts would be near 200,000 times the sum of two photon's energy.

[0022] The apparent reason could be that the quoted formulas might only refer to the kinetic energy of the photon, not its constitutional energy, in the same way that the kinetic energy of 1 Kg. of sugar falling from an altitude of 10 meters, has nothing to do with its constitutional energy given by

$E=mc^2$. Just to remember, the lack of mass of photons does not allow us to calculate their energy with Einstein’s formula.

Laser technology

[0023] Photons can be produced and directed as a beam using laser technology, or can be recovered from natural light or other sources, concentrated and redirected by the use of mirrors or lenses to form a beam of photons as dense as desired. Photon beams from lasers are monochromatic, coherent and very directional, while natural light photons are disperse, non-coherent and polychromatic.

[0024] To obtain photons from a laser system, a particular medium is “pumped” or stimulated, normally by flashes of light or by electrical discharges, to get the atoms into an excited state. Electrons from these excited atoms will jump to higher but unstable orbits. When these atoms relax, the electrons return to their normal orbit, but in the process they release energy in the form of photons. Photons, traveling at the speed of light, will stimulate new atoms, which will liberate more and more photons. A laser is more efficient when there are more atoms in the excited state than in the ground state, which is known as population inversion. The photons emitted in this way have a very specific wavelength that depends on the state of the electron’s energy when the photon is released. Two of the same atoms in identical state will release photons with identical wavelengths. A system of parallel mirrors, one of them partially silvered coated, will align the photons to produce a photon beam through the partially coated mirror.

[0025] There are many types of lasers depending on the medium utilized. The Laser medium can be a solid, gas, liquid, plasma or a semiconductor. Some laser types and their wavelengths are the following:

Argon Fluoride	193 nm (nanometers)
Krypton Fluoride	248 nm
Nitrogen	337 nm
Argon (blue)	488 nm
Argon (green)	514 nm
Helium neon (green)	543 nm
Helium neon (red)	633 nm
Ruby	694 nm

Nd:Yag (NIR)	1064 nm
Carbon Dioxide	10600 nm

[0026] Some of these lasers are inoffensive to humans but others are dangerous as the CO₂ because its wavelength is in the infrared and microwave part of the spectrum. Infrared radiation is heat and this laser can melt through whatever it is focused on.

[0027] Industrial and medical beams can be composed of electrons, positrons, neutrons, protons, hadrons, ions, X Rays, microwaves, etc. which could eventually be used as source of particles for collisions under the present inventions.

[0028] Fiber Optic Cable, a thin glass fiber cable (or a special type of plastic fiber) of just microns in diameter, can be used to transmit photons in a wide range of wavelength and frequencies. The light source can either be a light emitting diode (LED), a laser or common light properly directed. Light moves easily down the fiber-optic line because of principle known as total internal reflection, which states that when the angle of incidence exceeds a critical value, light can not get out of the glass; instead the light bounces back in. The speed of light will be affected by the medium through which it has to travel, being vacuum the best medium. The glass in the fiber-optic may reduce the speed of light to some extent, but in short distances may not be meaningful.

Electromagnetism, Electricity, and a new Theory of Electricity

[0029] It is well known that electromagnetism and electricity are interrelated phenomena, but yet our theories about how electricity forms from magnetism lack some explanations. It is believed that electricity consists of the flow of electrons traveling from the negative pole to the positive pole, phenomena some how created by the crossing of a magnetic field through a conductor. Still, there are too many unanswered questions in this theory. From what atoms or what particular matter would those electrons come from; what will be the condition of the matter that released its electrons by the trillions; in virtue of what would those electrons travel to the positive pole, to accommodate where?

[0030] Energy can transform into matter, and matter can transform back into energy, as we have been able to establish by scientific verification. But electrical energy has two different manifestations, equivalent but opposed, antithesis of each other, the positive and the negative.

[0031] Electricity must be the flow of both, the positive constituent and the negative constituent, created or dissociated from matter by the action of a moving magnetic field. What could be happening is that the crossing of a magnetic field through a conductor would create Electron Pairs, an electron (with a negative charge) and a positron (with a positive charge), which will flow in opposite directions by the action of the magnetic field movement, accordingly to the well known rule of thumb.

[0032] It has been proven in Multiwire Proportional Chambers that negatively charged electrons travel at much higher speeds than positrons, probably a thousand times faster, which may be the reason why we thought that only negative electrons travel in an electric circuit.

[0033] We could assert that: Electricity is the flow of both, the negative element and the positive element, the electron and the positron, in opposite directions along a conductor, induced by the crossing of a magnetic field through the conductor, in which, at the closing of the circuit, both will flow to the mutual encounter by the attraction of opposites, nullifying each other, annihilating each other, since each one is the antimatter of each other.

[0034] As electrons and positrons flow along the conductors we have the opportunity to use the phenomena in different ways, as electromagnetic force, heat, light, etc.

SUMMARY OF THE INVENTION

[0035] The present invention refers to a system for the practical and inexpensive procurement of huge amounts of energy derived from the principles of matter-antimatter generation and annihilation.

[0036] The Generator comprises several functions simultaneously: Generates photons at an exponentially increasing rate by the continuous excitement and stimulation of atoms; produces a continuously increasing concentration of photons traveling at the speed of light within a confined environment; induces forced collisions of photons at the speed of light at continuously increasing rates; generates Jets of particles and antiparticles of matter/antimatter by the collision of photons; converts particles and antiparticles' energy directly into electricity. A second embodiment will convert particles and antiparticles into antimatter fuel for propulsion purposes.

[0037] The foundation of the system is a specially designed Self-Reflective Chamber that: generates photons within itself; will not allow said photons to escape; continuously increases photon’s quantity and concentration at exponential rates. Photons trying to escape the Chamber will be reflected back to the chamber continuously and indefinitely, at or near the speed of light.

[0038] Hundreds of trillions of photons traveling at the speed of light will be crossing paths with other photons in a high and continuously increasing Photon Density environment, for which it is to anticipate that myriads of collisions could be taking place simultaneously. Each of these collisions will produce Jets of particles and antiparticles, which, this time, will pass across the walls of the Self-Reflective Chamber creating a continuous flow of particles and antiparticles toward the exterior of the Chamber.

[0039] Myriads of Jets of electrically charged particles and antiparticles passing across the masses of specialized Collecting Chambers simultaneously will generate ion-pairs dissociation, this is electrons and antielectrons or positrons, which in turn will generate myriads of avalanches of the same electrons and positrons. Electrons and positrons are then separated by the action of powerful Electromagnetic Rotational Fields, generating very high electric potentials or power across the terminals of the Collecting Chambers.

[0040] A second embodiment will, instead, separate the Jets of particles and antiparticles by charge, positive or negative, without any interference with matter, by the use of powerful Monopolar Electromagnetic Rotational Fields. Particles and antiparticles thus created and separated can be used as propellant fuel for rockets or combustion engines. Antimatter fuel could then be produced in site, on demand, in practically any amount.

[0041] In essence, the Antimatter Electrical Generator converts almost ordinary matter into pure energy.

DESCRIPTION OF DRAWINGS

[0042] Fig. 1 Self-Reflective Chamber aimed for the production of photons and photon’s collisions.

- [0043] Fig. 2 Front view of the Antimatter Electrical Generator, showing the basic elements of which it is made.
- [0044] Fig. 3 Lateral dissection of the Antimatter Electrical Generator.
- [0045] Fig. 4 Antimatter Electrical Generator’s insulated Collecting Chamber frontal dissection.
- [0046] Fig. 5 Electrical interconnections of the Antimatter Electrical Generator’s rotational electromagnetic field system, in a typical three phase arrangement.
- [0047] Fig. 6 The Electromagnetic Field Pattern created when a three phase alternating currents voltage is applied to coils spaced 120 spatial and electrical degrees, at a given instant.
- [0048] Fig.7 Rotational Electromagnetic Field created when a three phase alternating currents voltage is applied to coils spaced 120 spatial and electrical degrees, in one cycle.
- [0049] Fig. 8 Hypothetical collision of photons inside the Self-Reflective Chamber, and the dispersion of charged particles and antiparticles into the core and the Collecting Chamber masses.
- [0050] Fig. 9 Front view of the embodiment of an Antimatter Fuel Generator aimed to the production of antimatter fuel for propulsion systems, showing also the electrical interconnections for the generation of a Monopolar Rotational Magnetic Field.
- [0051] Fig. 10 Three Phase Direct Current System power pattern curves, for the creation of a Monopolar Rotational Electromagnetic Field.

- [0052] Fig. 11 Electromagnetic field pattern created by the application of Three Phase Direct Current Voltages to the Antimatter Fuel Generator, at a given instant.
- [0053] Fig. 12 Rotational Monopolar Electromagnetic Field created when Three Phase Direct Current Voltages are applied to coils spaced 120 spatial and electrical degrees, in one cycle.
- [0054] Fig. 13 Lateral dissection of the Antimatter Fuel Generator showing hypothetical particles and antiparticles being separated and deviated towards opposite ends of the generator.
- [0055] Fig. 14 A second embodiment of the Antimatter Fuel Generator where the Cooling Chamber has been removed.

DETAILED DESCRIPTION OF THE INVENTION

PART A - ELECTRICAL SYSTEMS

Principles for the Antimatter Electrical Generator

[0056] The Antimatter Electrical Generator is designed to utilize the following principles: photons production by the stimulation of atoms with electric discharges, light flashes, or any other means; photons amplification by population inversion of excited atoms; particle-antiparticle production by the collision of photons; ion-pairs generation by the striking of high energy charged particles with atoms at rest, and subsequent generation of electron-positron avalanches within conducting materials; finally, the separation of electron-positron pairs by the crossing of strong electromagnetic forces, originating the phenomena know as Electricity.

Physical Description

[0057] Figs. 1, 2 and 3 refer to the basic elements of an Antimatter Electrical Generator designed for the direct production of Electric Voltages and Currents, which embodies in itself a Particle Generator, a Particle Accelerator, a Particle Collider, a Detector-Collector of matter and antimatter particles, and an Electrical Generator.

[0058] The foundation of the system is a Self-Reflective Chamber 1, shown in Fig. 1, positioned at the center of the generator, as shown in Fig.2, comprising: a cylinder 2, two end lids 3, one at each end of the cylinder, a pair of electrodes 6, one at each end lid and means to assemble hermetically said cylinder to said lids (not shown), being the entirety of its inner surface highly reflective to photons, conforming a self-reflecting confined space.

[0059] The cylinder 2 itself must be made of non-electrically conductive materials as glass, ceramics, synthetics or even of metals as far as they are properly electrically insulated. The purpose is not to interfere with high voltages or discharges needed to start the system, as will be described later on. Its inner surface must be as highly reflective to photons as possible, in its entirety. If manufactured of mirrored glass including metallic paints, the reflective plate should be properly insulated to avoid electric shortcuts.

[0060] The end lids 3 can be made of non electrically conductive materials having a highly reflective inner surface and electrodes 6 having also a highly reflective surface to the inside, placed in such a way that it will expose its reflective surface to the inside of the chamber, while preserving the sealing.

[0061] Said electrodes 6 are designed to produce electrical discharges for the stimulation or pumping of said lasing medium, but said lasing medium can be stimulated by other means as internally generated flashes of light, diode pumping, external sources of light transmitted by fiber cable means, or any other means.

[0062] Another embodiment would be to fabricate the lids 3 of highly reflective and electrically conductive metals or materials, so as to serve simultaneously as electrodes. Electrodes could eventually be replaced by a single Fiber Optic cable (not shown), substituting the electric discharges for flashes of appropriate frequency and wavelength light.

[0063] Lids' inner surface can be flat, concave, convex or of any other type of reflective surface, depending on the desired direction for the photon's reflection.

[0064] The Self-Reflective Chamber 1 has in its interior a lasing medium 5, either it is a solid, a liquid, a gas, a plasma, a semiconductor, or any other type of lasing medium, or any other photons' emitting system. Said Self-Reflective Chamber can be totally filled with the lasing medium or being partially filled with said lasing medium and partially filled with light emitting gasses or materials.

[0065] While not in the scope of the present invention and for the same reason not shown in drawings, said Self-Reflective Chamber 1 must have external means to provide the energy or the means for the excitement, stimulation or pumping of said lasing medium, comprising but not limited to: electric power; electronic controls; high voltage systems; light transmitted by fiber cable means.

[0066] A second cylindrical chamber, or Cooling Chamber 8, Figs. 2 & 3, goes around the Self-Reflective Chamber 1, it is essentially an empty chamber, left for cooling purposes, either the coolant is air, water, or any other, and only for the case of excessive heat in the Self-Reflective Glass Chamber 1.

[0067] The whole system is incorporated in a Ferromagnetic Assembly as shown in Figs. 2 & 3, having a Laminated Ferromagnetic Core 9 of high magnetic permeability and inductance and low inherent losses, as in high efficiency electrical generators, containing a plural number of slots 13, a plural but equal number of legs 12, both radially distributed, and a central cylindrical space. The diameter of the Core 9 will depend on the distance particles and antiparticles travel through said Ferromagnetic Assembly, after the photon's collisions inside said Self-Reflective Chamber 1.

[0068] Each lamination is made of one thin single piece of high magnetic permeability and inductance and low inherent losses metal, dielectrically insulated, so that there won't be air gaps or changes on materials along the magnetic path. This will permit the creation of a very strong magnetic field with a reduced amount of electrical energy. Laminations can also be fabricated of assembling pieces, taking care not to leave air gaps in between. The number of laminations will depend on the desired length of the unit, the thickness of the lamination and its insulation.

[0069] Collecting Chambers 10 may consist of solid blocks of dense metals as lead, steel or copper; electromagnetic coils properly arranged; or even contained liquids, gases or plasmas, as far as they can conduct electricity efficiently. Said Collecting Chambers 10 will fill most of the available space

in the referred slots 13, all along the Ferromagnetic Core 9. Said Collecting Chambers should be properly dielectrically insulated 10A as shown in Fig. 4, accordingly to the high Electrical Potential to be generated. For convenience, said Collecting Chambers 10 may extend outside over said Ferromagnetic Core 9, as shown in Fig. 3, to accommodate electric conducting terminals or cables (not shown in drawings). Said Collecting Chambers 10 should stop most of said particles and antiparticles thoroughly, with the exception of Muons.

[0070] Electric Coils 11 are placed at the outermost end of the Ferromagnetic Core legs 12, as shown in Figs. 2 & 5. The opposite pairs of Electromagnetic Coils 11a-11aN, 11b-11bN, and 11c-11cN are connected in series. Three ending terminals are connected in Y, to form a Neutral 15, in a typical Three Phase arrangement, as shown in Fig. 5. Three Phase Voltage, spaced 120 electrical degrees, is to be applied through terminals 11A, 11B and 11C. The source of three phase voltage is not in the scope of the present invention, and for the same reason is not shown in drawings.

[0071] The Electromagnetic Field Pattern 14 created at a given instant by the application of an external source of Three Phase Voltage to terminals 11A, 11B and 11C (Fig. 5), is shown in Fig. 6. Since there are not air gaps or change in materials and because of the high magnetic permeability and inductance, we can create a very strong electromagnetic field over 2 Teslas, and under superconducting conditions, up to 10 Teslas. The application of the Three Phase Voltages spaced 120 electrical degrees will create a strong Rotational Magnetic Field within the Core 9, as shown in Fig. 7.

Phenomena Description

[0072] When the Self-Reflective Chamber's 1 lasing medium 5 is excited or “pumped” by the application of high voltages to the pair of electrodes 6, as to create an electric arc through the lasing medium 5, or by the application of light flashes, in a similar way as Lasers and/or Fluorescent bulb lights get excited, it's atoms will start releasing photons 7 which will travel in all directions at or near the speed of light, within the Self-Reflective Chamber 1.

[0073] As all surfaces around the lasing medium are highly reflective surfaces or mirrors, the photons thus formed will be continually and indefinitely reflected from the inner surface, at or near the speed of light. These photons, in turn, will excite more atoms, and more photons will be released,

rapidly causing a population inversion. As photons will always be reflected from the inner surface they can not escape from said Self-Reflective Chamber 1. As more photons form, and more atoms get excited just to release more photons, with no stop to the process, the photon density will start to mount up at higher and higher rates.

[0074] At certain point the photon density within said Self-Reflective Chamber 1 will be so high that photons traveling at or near the speed of light in all directions will start to collide with other photons crossing in their paths; but, still, the photon density will continue to increase until the number of collisions and the consequent disintegration of photons at a given instant enter in equilibrium with the production of new photons.

[0075] Each pair of collided photons will disintegrate into beams of particles and antiparticles, which will this time pass across the cylinder walls in uncertain directions into the laminated Ferromagnetic Assembly and the Collecting Masses 10, setting free a formidable amount of energy, that could be in the order of 183 to 209 GeV per collision as mentioned before. Fig. 8 shows a hypothetical instant within said Ferromagnetic Assembly at work.

[0076] Quarks and antiquarks, and their correspondent beams of particles and antiparticles, after abandoning said Self-Reflective Chamber 1 through its walls, will penetrate into the Collecting Chambers 10, colliding with atoms at rest of the chambers' component matter all along their mean paths.

[0077] The striking of said charged particles and antiparticles with atoms at rest within said Collecting Chambers will cause the ionization of said atoms and the production of electron-ion pairs, this is, electrons and positrons. The pairs of electrons created will continue to drift, creating more electron pairs and so on, forming, under appropriate circumstances, what is known as an avalanche multiplication, as described above in Multiwire Proportional Chambers in paragraph 0012.

[0078] At the same time, the charged particle or antiparticle will continue to impact more and more atoms at rest, until it losses all its energy, causing a great number of avalanches. If nothing separates the ion pairs by force, they will reunite and nullify each other soon after the crossing of the charged particle, and matter atoms will be back at rest.

[0079] Now, in the same way as the crossing of an electromagnetic field through a conductor will cause the separation of electron pairs in opposite directions causing the phenomena known as Electricity, the above referred Rotational Electromagnetic Field 14 will also cause the separation of the ion pairs created by the passing of charged particles through the component matter of the Collecting Chambers 10.

[0080] The Collecting Chambers 10, being a conductor under a moving magnetic field, will act as a secondary coil to the opposite pairs of Electromagnetic Coils 11a-11aN, 11b-11bN, 11c-11cN, for which the Collecting Chambers 10 will carry a voltage of their own, which will be proportional to the inducting voltage and the turns ratio between the primary coil and the “secondary”.

[0081] The crossing of the Rotational Electromagnetic Field 14 will separate as well the electron pairs created by the induction of voltage and the electron pairs and their avalanches created by the collision of charged particles with atoms at rest, for which the Electric Potential or Voltage at said Collecting Chambers 10 will be significantly augmented, proportionally to the additional number of electron pairs present at a given instant.

[0082] The flow of electrons and positrons along the Collecting Chambers 10 in opposite directions will manifest as Electric Alternating Currents, since the rotation of the magnetic field will change polarity every half cycle, and so the direction in which the electrons and positrons will flow.

[0083] Said charged particles will be crossing also the laminated Ferromagnetic Core 9 metal, outside the Collecting Chambers 10, and will also ionize and create electron pairs by the striking of its atoms at rest, but since those electrons have no where to go, due to the thin lamination and the insulation of said laminations, the pairs will neutralize them selves soon after the passing of the charged particle and its atoms will be back at rest.

[0084] Said charged particles, once they have lost all their energy in the process, will stop and probably react with the matter of the Collecting Chambers 10 or the Core’s matter, and nullify themselves.

[0085] The induction itself can only produce a similar amount of power as we have put in to create the Rotational Electromagnetic Field 14, but the additional electron pairs and their avalanches that come from the disintegration of photons within the Self-Reflective Chamber 1 and their collision with atoms at rest in the Collecting Chambers 10, will create a much higher power out than we had put in, without violating any Physics law.

[0086] Now, how highly will the photon density increase before the number of photon's collisions enter in equilibrium with new photons production at a given instant, is, off course, unknown, but this equilibrium point will perfectly determine the Nominal Electrical Potential of the generator for uninterrupted usage purposes.

[0087] The total amount of energy a device like this might release in its life time, may be given by $E=mc^2$, if the formula is correct or applicable, where m would be the mass of the lasing medium within the Self-Reflective Chamber 1.

[0088] This would imply that photons produced by the stimulation of matter are actually the conversion of such matter into pure energy. If it occurs that at some point the mass of the lasing medium totally disintegrates into energy, the simple replacement of said matter will reactivate the process and the electric generation.

PART B - ANTIMATTER FUEL SYSTEMS

Principles for the Antimatter Fuel Generator.

[0089] The Antimatter Fuel Generator is designed to utilize the following principles: photons production by the stimulation of atoms with electric discharges, light flashes, or any other means; photons amplification by population inversion of excited atoms; particle-antiparticle production by the collision of photons; and the separation of charged particles and antiparticles by charge by the action of a strong Monopolar Rotational Magnetic Field.

Physical Description

[0090] Figs. 9 and 13 refer to the basic elements of an Antimatter Fuel Generator designed for the direct production of Antimatter Fuel, which embodies in itself a Particle Generator, a Particle

Accelerator, a Particle Collider and a Particle-Antiparticle Separator. The whole system is incorporated in a second Ferromagnetic Assembly as shown in Figs. 9, 13 and 14, having a laminated Ferromagnetic Core 20 of high magnetic permeability and inductance and low inherent losses, containing a plural number of salient poles 21 radially distributed, and having a central circular hole. The outer and the inner diameters of said Ferromagnetic Core 20 will depend on the distance particles and antiparticles may travel through said second Ferromagnetic Assembly, in the same way as in prior embodiment.

[0091] Each lamination is made of one thin single piece of high magnetic permeability and inductance and low inherent losses metal, dielectrically insulated, so that there won't be air gaps or changes on materials along the magnetic path. This will permit the creation of a very strong magnetic field with a reduced amount of electrical energy. Laminations can also be fabricated of assembling pieces, taking care not to leave air gaps in between. The number of laminations will depend on the desired length of the unit, the thickness of the lamination and its insulation.

[0092] Figs. 9 and 13 show the embodiment of an Antimatter Fuel Generator 17 where the same types of Self-Reflective Chamber 1' and Cooling Chamber 8' described above for the first embodiment, are placed at the center of the generator, supported by vertical columns 29 of neutral materials as glass or ceramic.

[0093] Between the Cooling Chamber 8' and the Ferromagnetic Core 20 goes a Vacuum Collecting Chamber 18 which is a pipe or tube 19 built preferably of a non electrically and non magnetically conductive material as glass or ceramic. Said Vacuum Collecting Chamber 18 is placed all along the Antimatter Fuel Generator 17 as shown in Fig. 13, extending to the exterior of the generator in order to be able to connect it with a vacuum electromagnetic transportation and management external system for said particles and antiparticles. The external system, which may be a conventional antiparticles transportation system, is not under the scope of the present set of inventions and not shown in drawings.

[0094] A third embodiment shown in Fig. 14 shows an Antimatter Fuel Generator not having a Cooling Chamber to avoid the loss of antimatter particles while passing through the cooling substances and the Cooling Chamber itself.

[0095] Plural number of pairs of coils 22a-22aN, 22b-22bN and 22c-22cN are placed each pair in opposed poles, as shown in Fig. 9, having each of the coils two terminals 23, one for positive direct current voltage and one for negative direct current voltage.

[0096] A complementary invention necessary for the operation of the Antimatter Fuel Generator is a Three Phase Direct Current Voltage System as shown in Figs. 9 and 10, designed to produce a Rotational Monopolar Electromagnetic Field by the use of three pairs of exactly opposed sinusoidal wave shaped direct currents 24, spaced 120 electrical degrees among pairs. The first pair of opposed sinusoidal wave shaped direct currents is shown as Phase A 26A, the second pair is shown as Phase B 26B y the third pair is shown as Phase C 26C in Fig. 10. The power pattern 25 produced when such Three Phase Direct Current Voltages are applied to the terminals 23 of coils 22a-22aN, 22b-22bN and 22c-22cN is also shown in Fig. 10.

[0097] Fig. 11 shows the electromagnetic pattern formed at a given instant when said Three Phase Direct Currents Voltages are applied to terminals 23 of coils 22a-22aN, 22b-22bN and 22c-22cN in the way indicated above and in Figs. 9 and 10. All said salient poles 21 will have the same magnetic polarity to the inside, invariably, creating thus a Rotational Monopolar Electromagnetic Field 27 to the inside of said Ferromagnetic Assembly, while the opposite pole will always go outwards toward the common ring of said Ferromagnetic Core 20.

[0098] Fig. 12 shows the inwards Rotational Monopolar Electromagnetic Field pattern developed when the Three Phase Direct Currents described above are applied to terminals 23 of coils 22a-22aN, 22b-22bN and 22c-22cN within a given time period.

[0099] The external source and methods for the generation of these exactly opposed sinusoidal wave shaped direct currents 24 are not in the scope of the present invention. For the same reason said external source is not shown in drawings.

[0100] Figs. 13 and 14 are showing in longitudinal cut, the hypothetical separation and the ejection of particles and antiparticles 28 in opposite directions by the action of the Rotational Monopolar Electromagnetic Field.

Phenomena Description

[0101] Particles and antiparticles traveling outside of said Self-Reflective Chamber 1' could be separated by today's conventional means, this is directing and managing them with the use of magnetic and electric fields, as in many particle accelerators in use today. But, in order to simplify the separation and extraction of particles and antiparticles from the generator in a secure way, a design involving the use of a Three Phase Direct Current Monopolar System is presented here.

[0102] Antimatter particles must be handled in vacuum and shielded with electromagnetic fields to avoid their reaction with normal matter or with their antiparticles. For this reason a Vacuum Collecting Chamber 18 is necessary. Now, since the Vacuum Collecting Chamber 18 will be exposed to a rotational electromagnetic field, it may produce parasite currents in its walls if made of a conducting material, for which it would be more appropriate to build it of a non conducting material like glass or ceramics.

[0103] The Rotational Monopolar Electromagnetic Field will expel the electrically charged particles and antiparticles created inside said Self-Reflective Chamber 1' at high speed, probably near the speed of light and in opposite directions, in a similar way as ion pairs are separated and expelled in opposite directions by the relative movement of a magnetic field as described above for the Antimatter Electrical Generator. But this time, as only one pole is constantly passing through, the direction at which charged particles and antiparticles will be deviated will remain constant.

[0104] Some of the particles and antiparticles coming from said Self-Reflective Chamber 1' may be lost by entering in contact with the materials of the referred columns supporting said Self-Reflective Chamber 1' and said Cooling Chamber 8' or their walls, the cooling element, the Vacuum Collecting Chamber 18 walls or by reaching the referred Ferromagnetic Core 20. For this reason, the preferred embodiment should have as few elements in the particles' paths as possible, as the one presented in Fig. 14, not having a Cooling Chamber.

[0105] An alternating current rotational field could also separate charged particles and antiparticles in opposite directions, but their directions will change as fast as the polarity changes, sending both, matter and antimatter, in the same direction within very short intervals creating hard to handle

difficulties and risks of monumental explosions, due to the possibility of a very high number of particles and antiparticles very close to each other, separated only by electromagnetic fields.

[0106] Particles and antiparticles obtained by photon's collisions inside a relatively simple chamber as the one described in the present set of complementary inventions, could be the practical solution for the propulsion of spacecraft, among many other possible uses. The power potential of the recombination of particles and antiparticles obtained from photon's collisions is still uncertain, but it might be apparently very high.

[0107] Instead of having enormous antimatter production plants on earth, huge storing devices or facilities and a whole antimatter fuel transportation infrastructure, Antimatter Fuel could be produced on demand, on the site, in practically any amount.

CLAIMS:

(CLAIMS are omitted until a final arrangement with the Patent and Trademark Office is reached)

Fig. 1

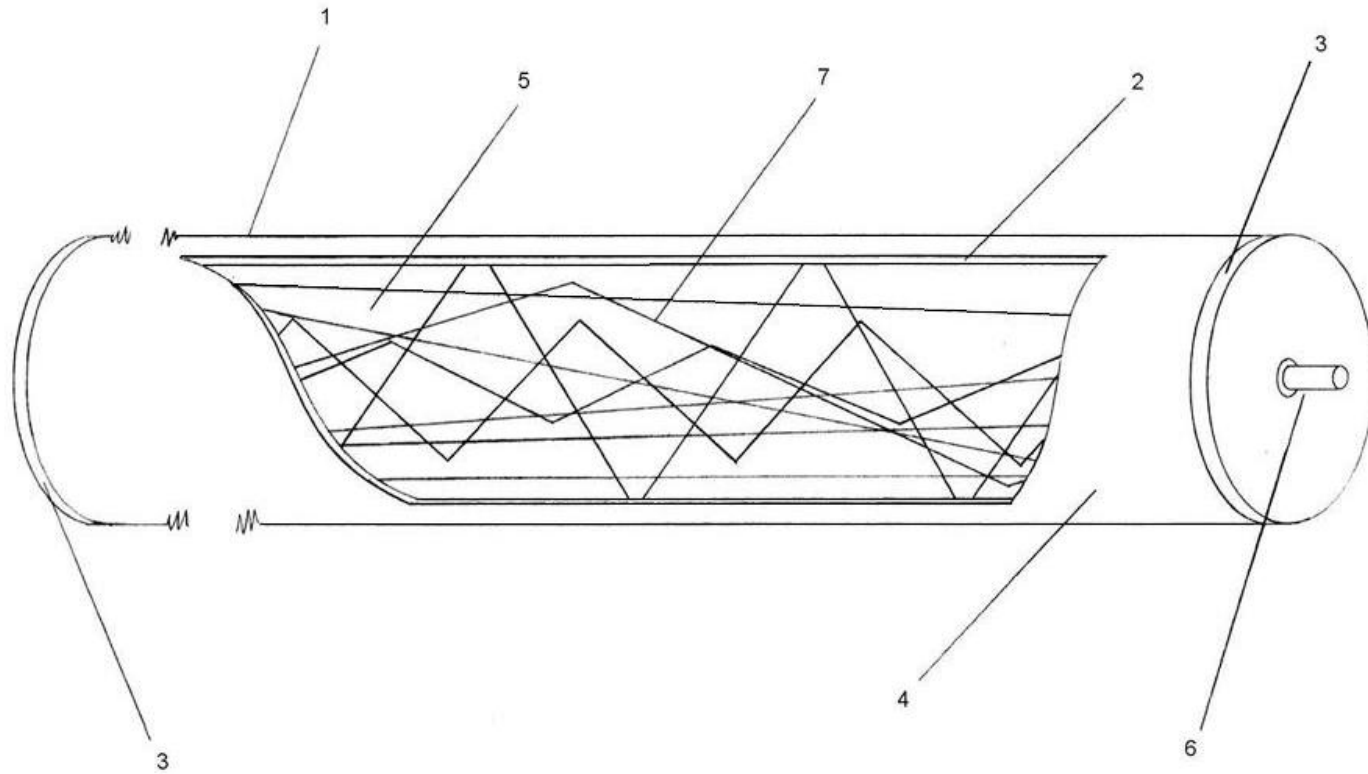


Fig. 2

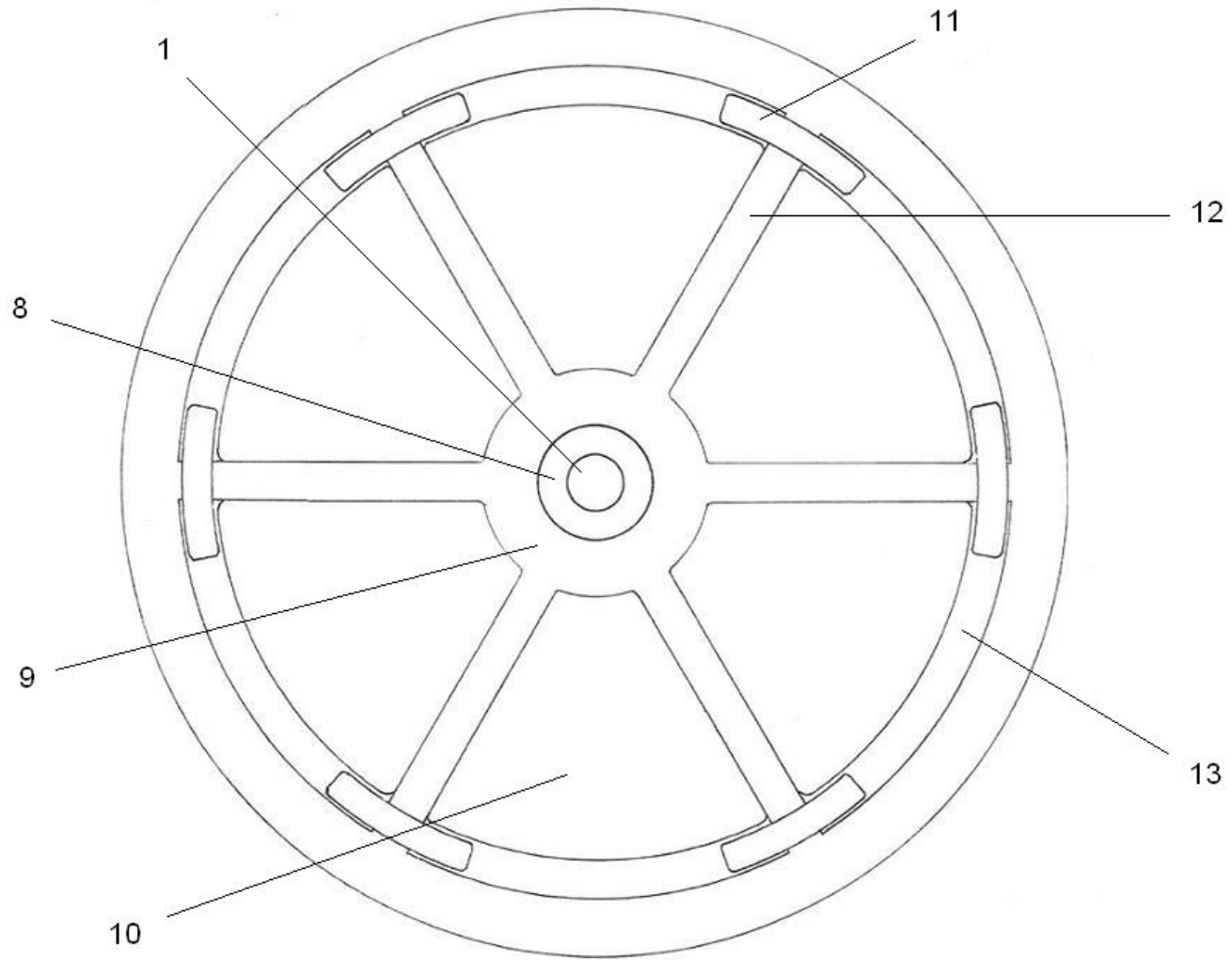


Fig.3

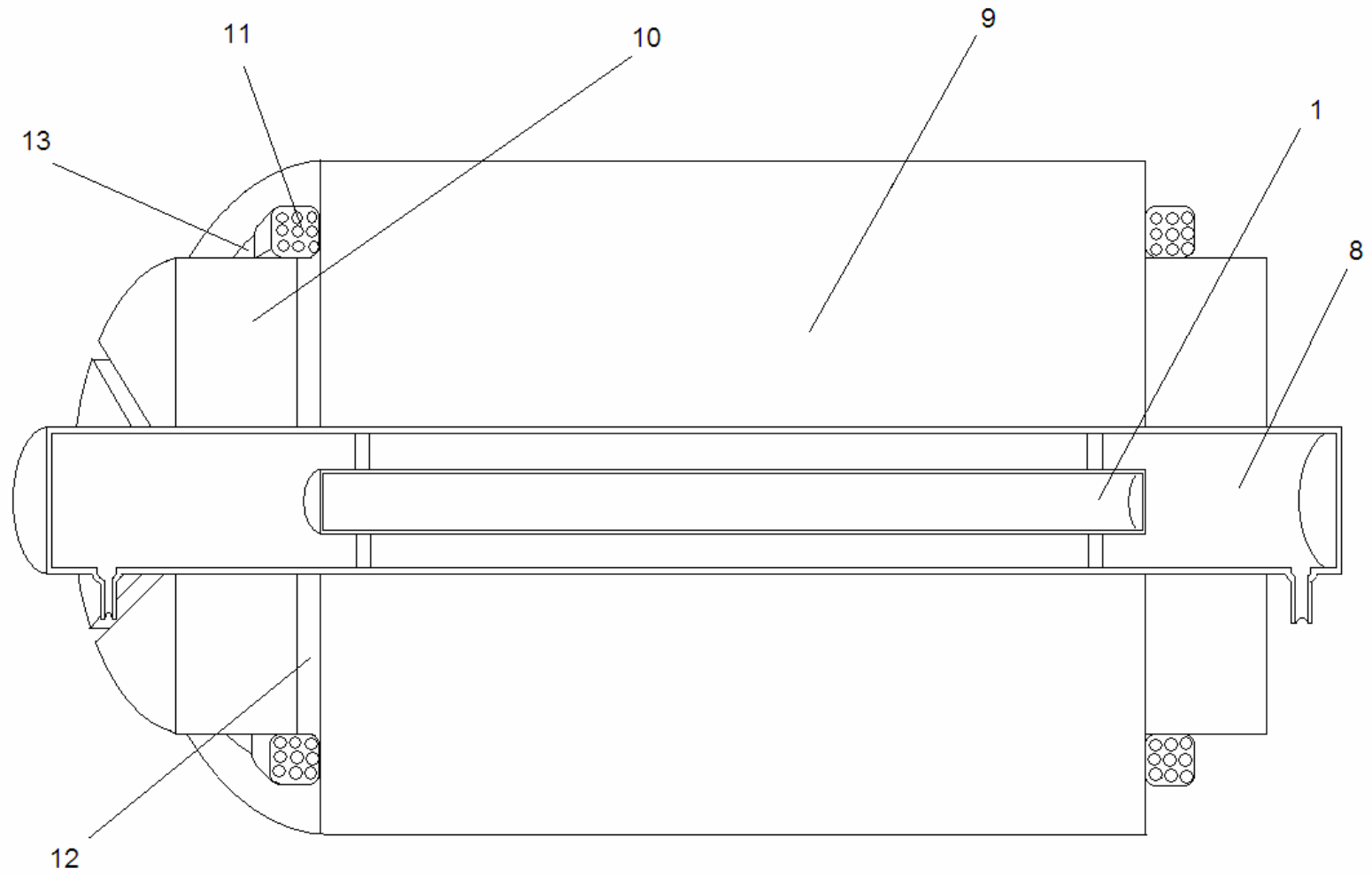


Fig. 4

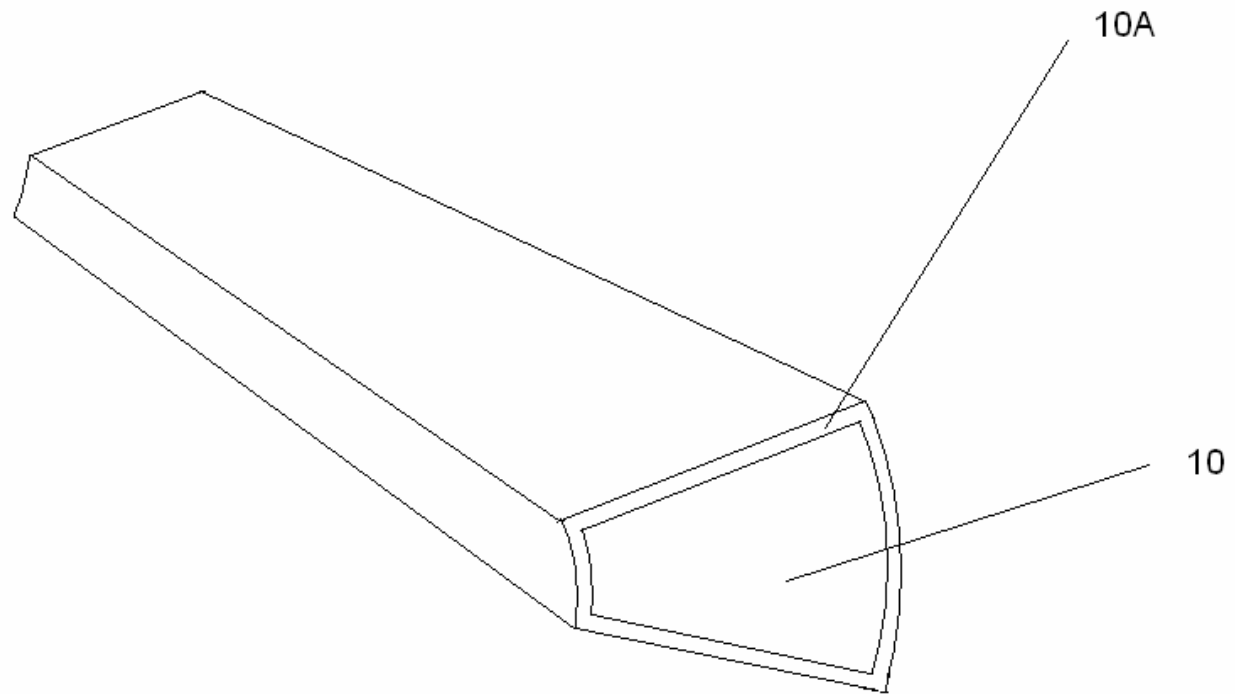


Fig. 5

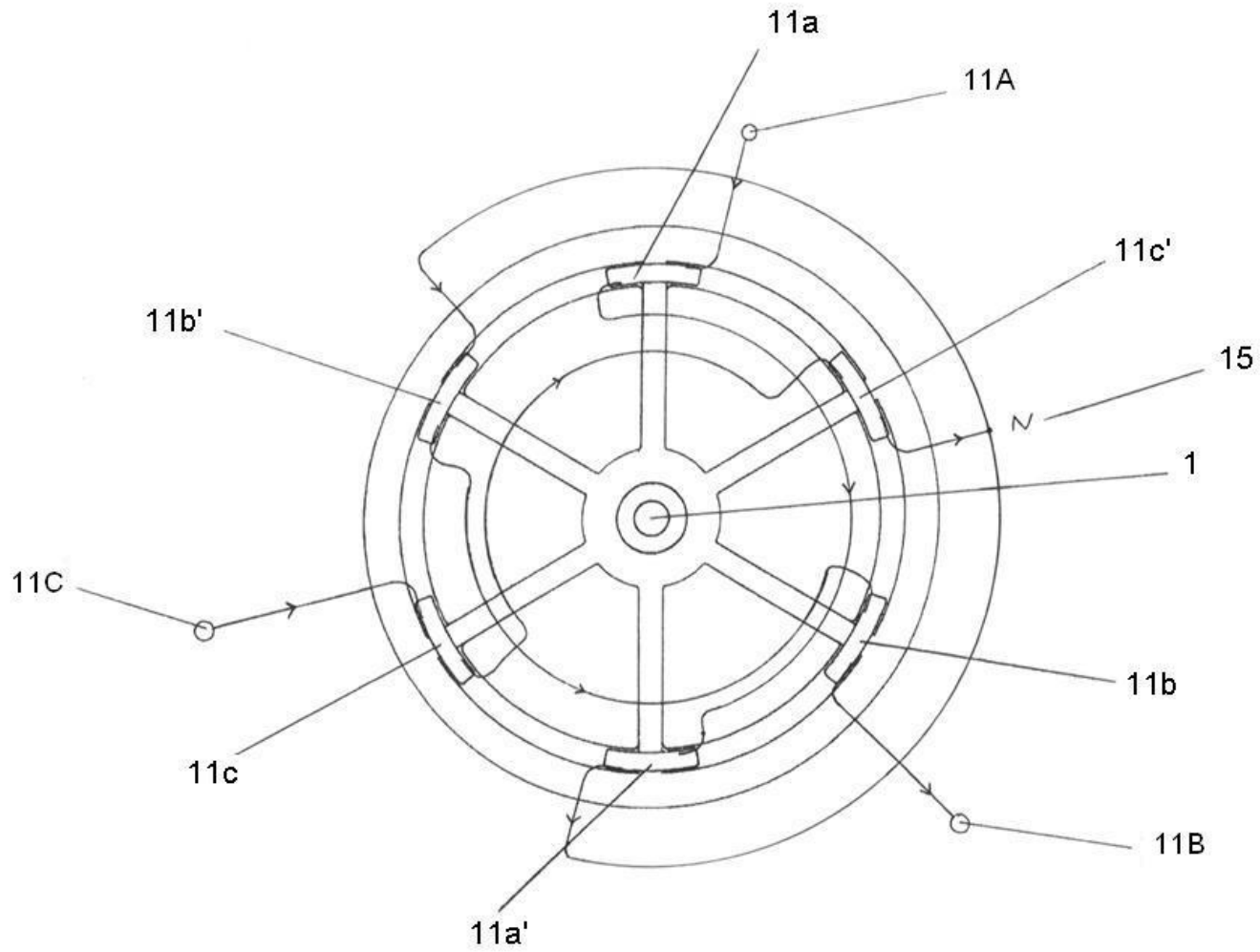


Fig. 6

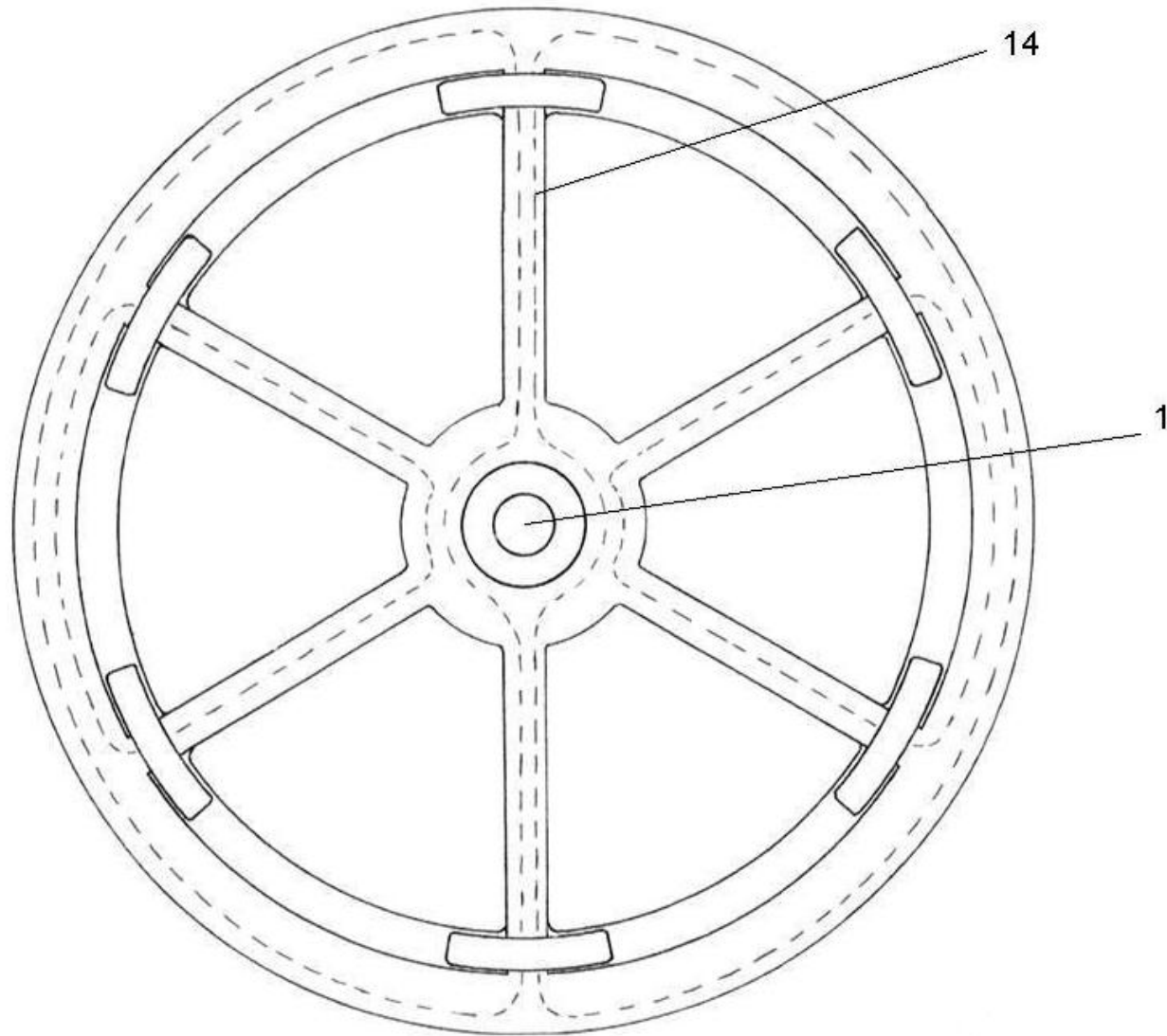


Fig.7

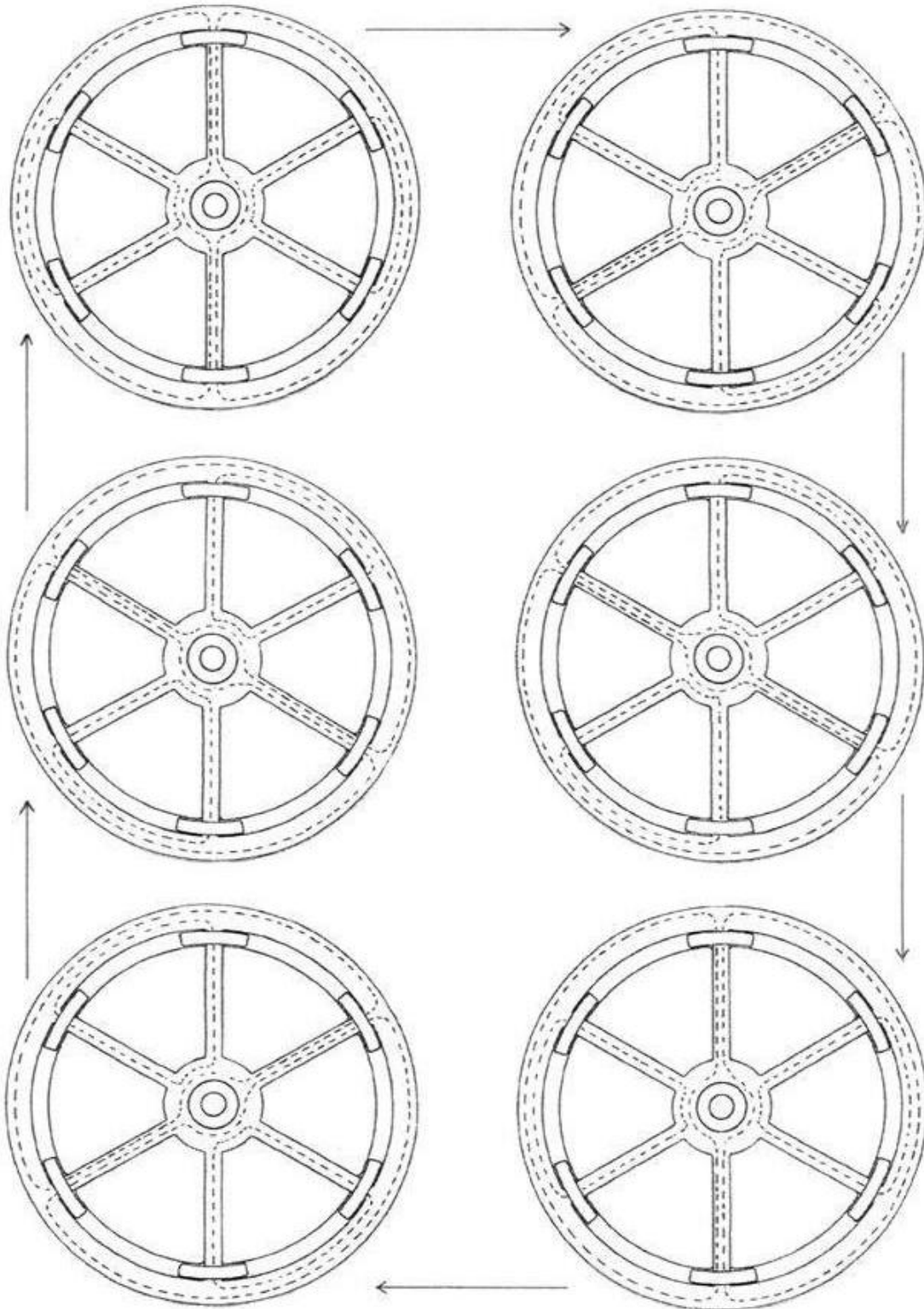


Fig. 8

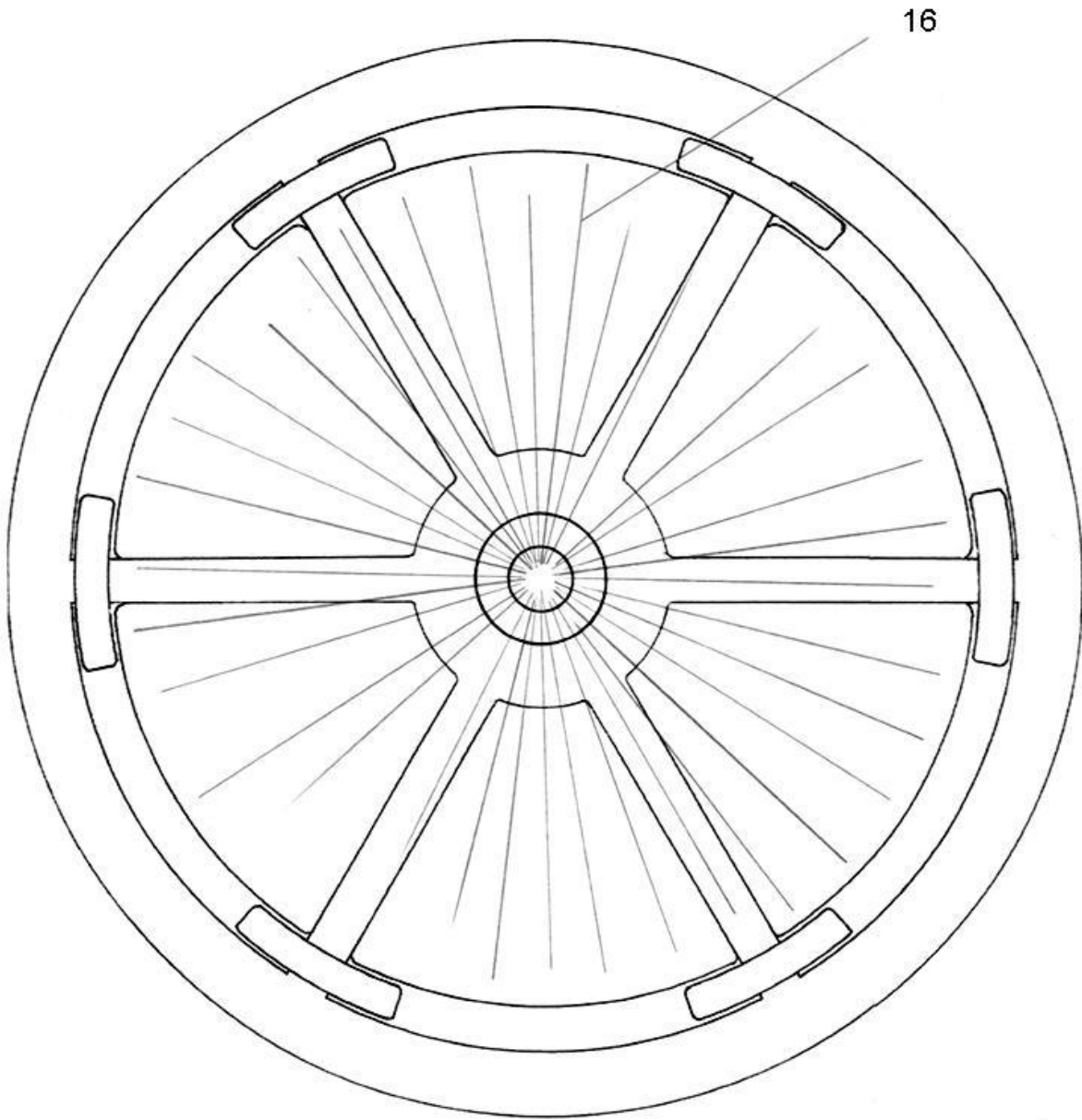


Fig. 9

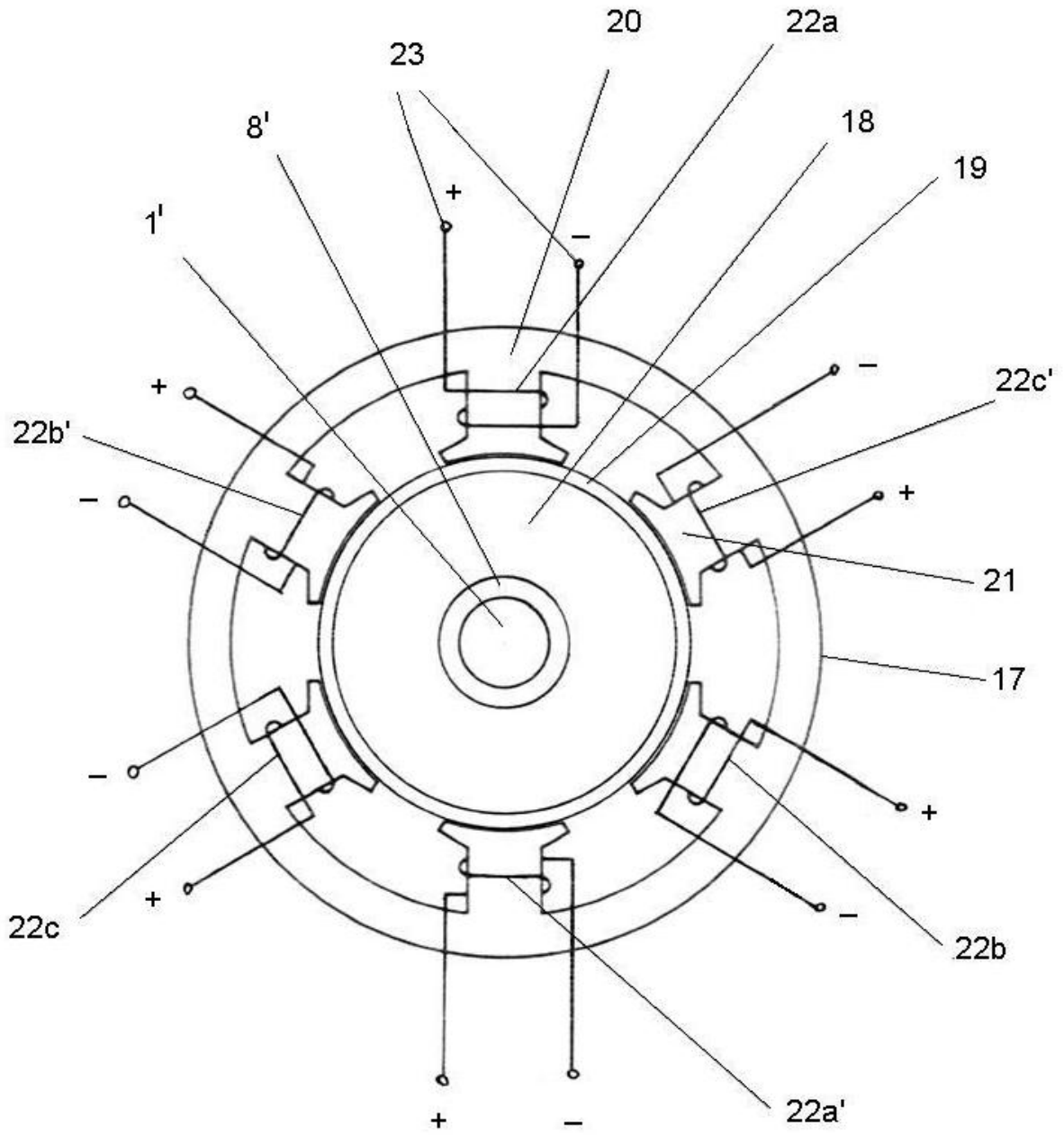


Fig. 10

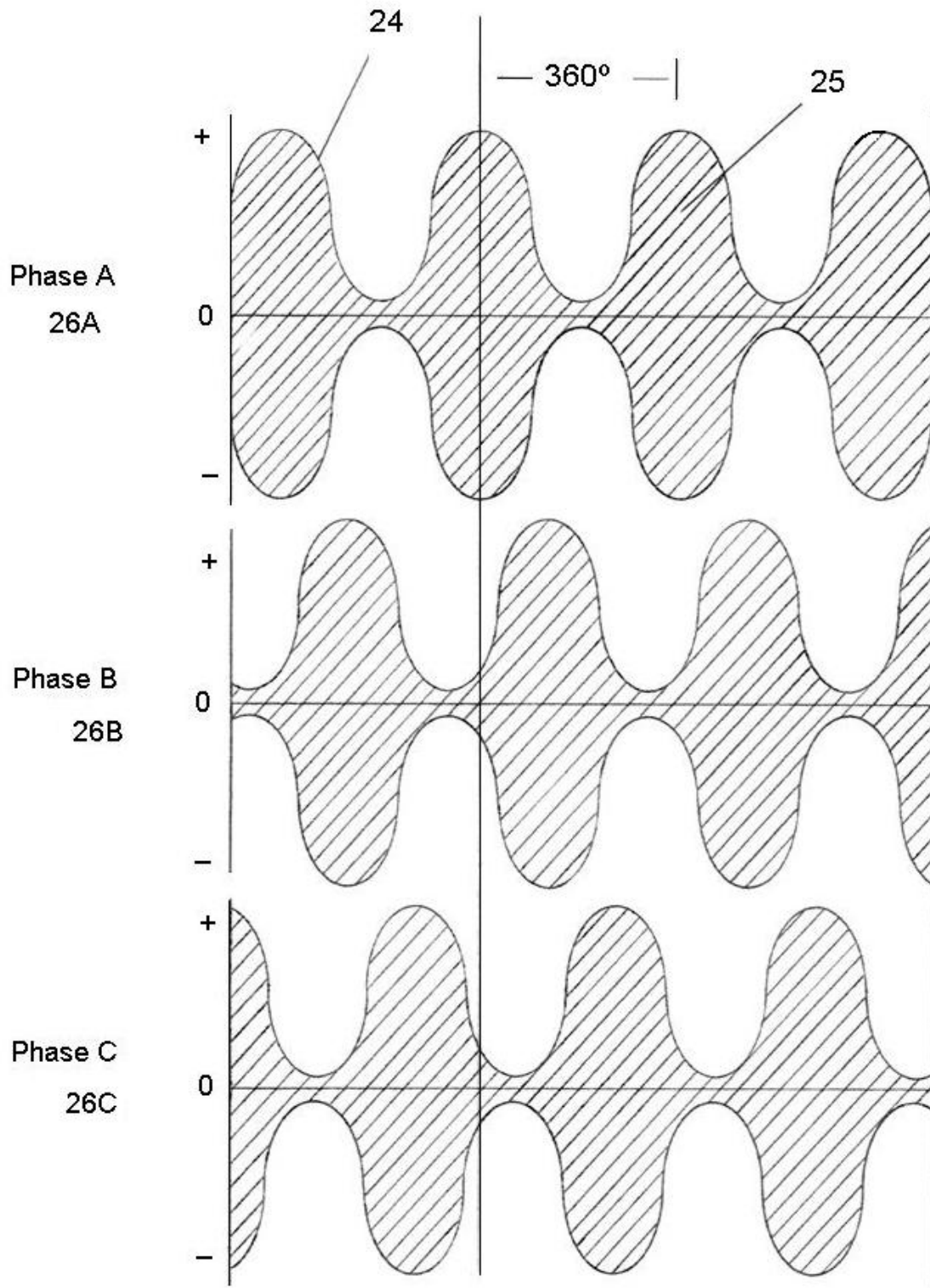


Fig. 11

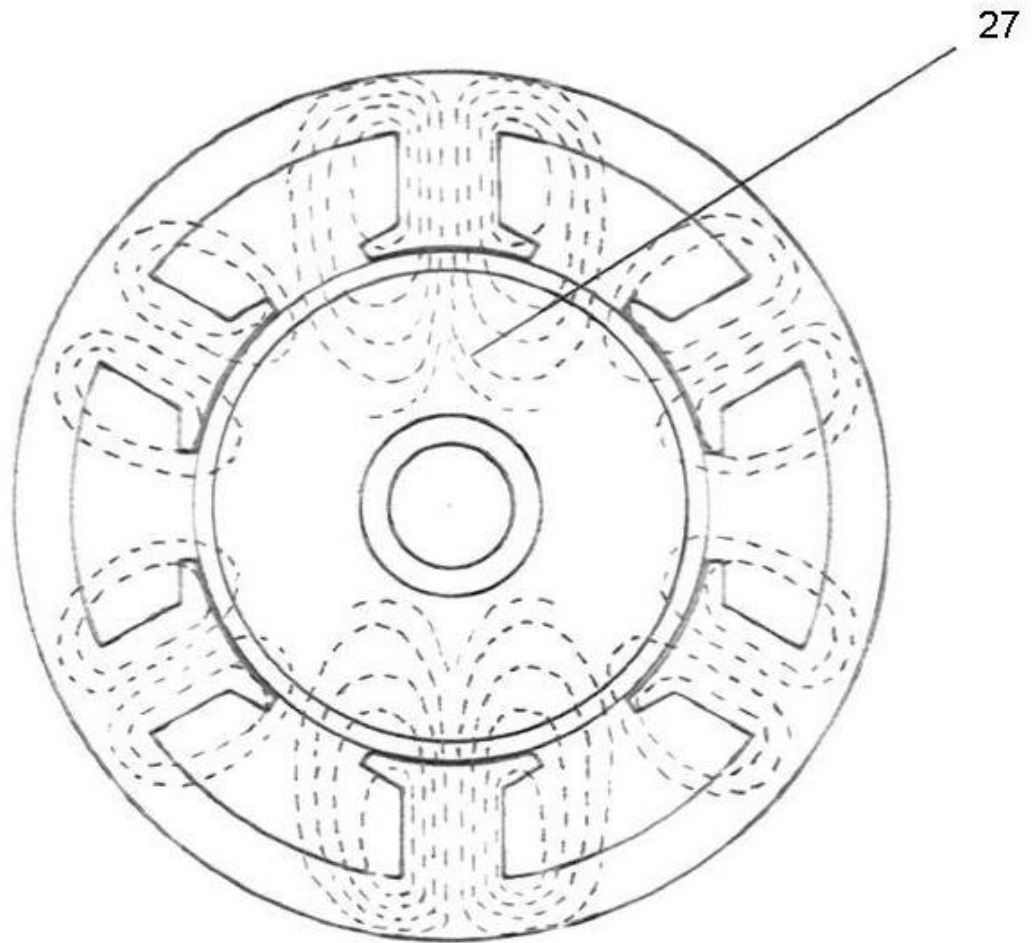


Fig. 12

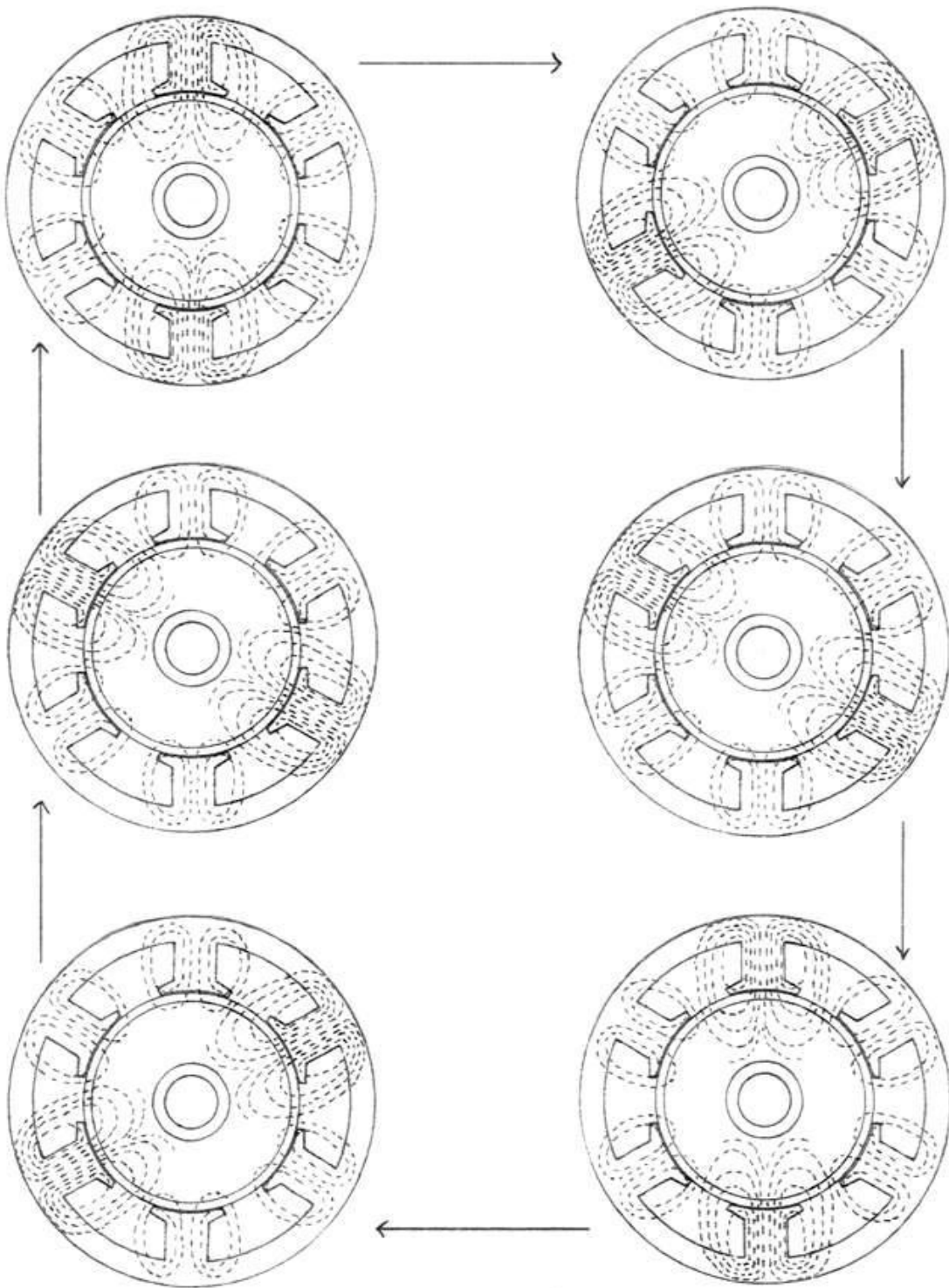


Fig. 13

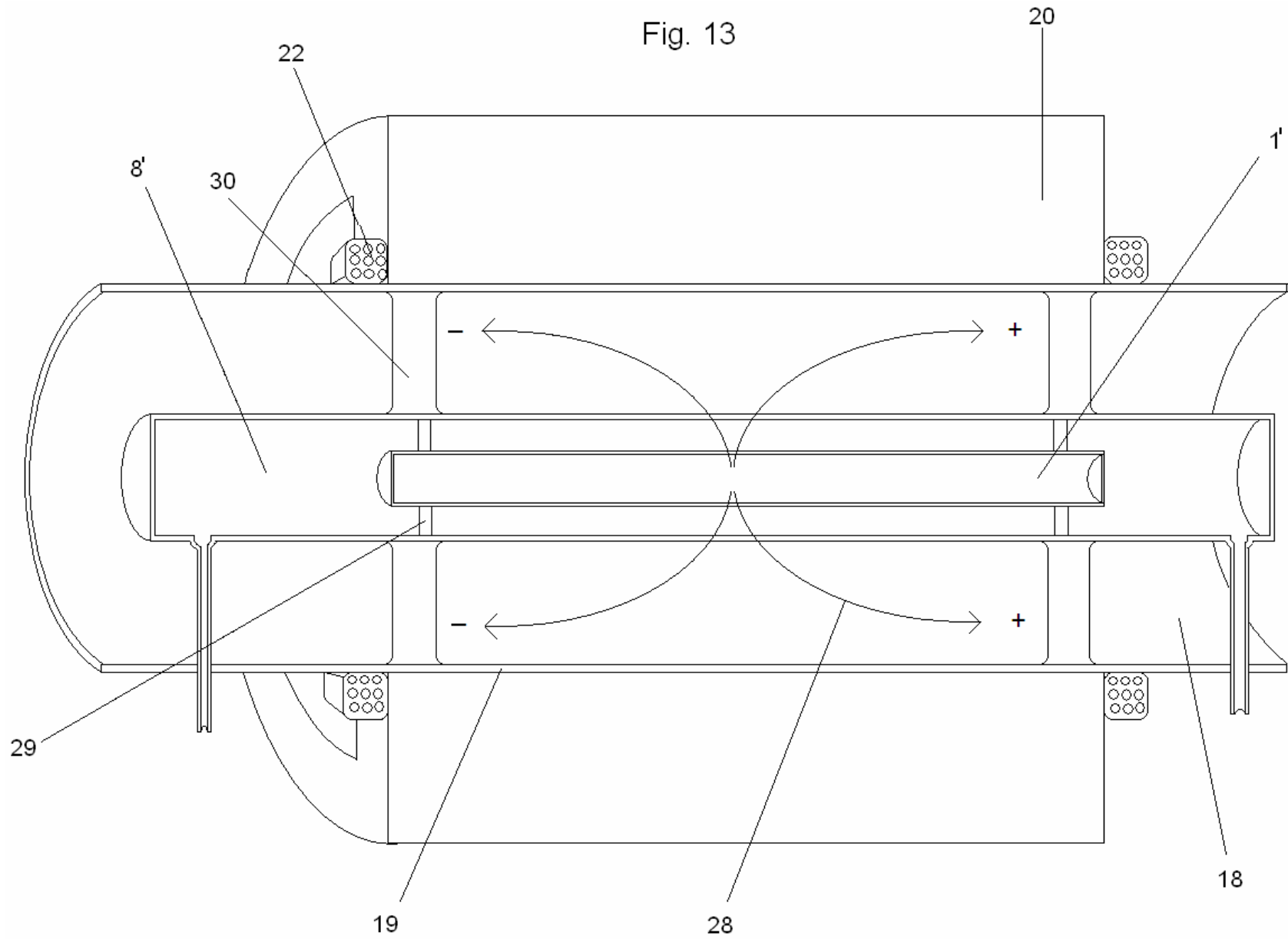


Fig. 14

